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(54) **REGENERATIVE ELECTRICAL POWER SYSTEM WITH STATE OF CHARGE MANAGEMENT IN VIEW OF PREDICTED AND-OR SCHEDULED STOPOVER AUXILIARY POWER REQUIREMENTS**

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CPC ***H01M 50/20*** (2021.01); ***B60K 6/28*** (2013.01); ***B60L 50/60*** (2019.02);
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CPC B60L 50/10; B60L 50/12; B60L 50/14; B60L 50/15; B60W 10/24; B60W 10/26
See application file for complete search history.

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(57) **ABSTRACT**

Systems and methods to control recapture and use of energy to provide an APU include a vehicle having an electrically powered drive axle to provide supplemental torque to the vehicle to supplement primary motive forces applied through a separate drivetrain powered by a fuel-fed engine of the vehicle. The vehicle further includes an energy store to supply the electrically powered drive axle with electrical power or receive energy recovered using the electrically powered drive axle. The vehicle also includes the APU coupled to receive electrical power from the energy store for stopover operation and without idling of the fuel-fed engine. Further, the vehicle includes a hybrid control system for managing, based on an estimated travel time to a stopover location, an SoC of the energy store while the vehicle travels over a roadway to provide a target SoC of the energy store when the vehicle arrives at the stopover location.

19 Claims, 9 Drawing Sheets